Attributable mortality and economic burden of temperature in the western pacific region

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Background : Temperature-related health impacts are a growing concern in the Western Pacific Region, where diverse climatic, demographic, and socioeconomic contexts increase vulnerability. Previous studies have quantified heat- and cold-related mortality in selected countries, but regional estimates including economic burden are limited.

Objectives : This study provides estimates of mortality and economic costs attributable to hot and cold temperatures across the Western Pacific Region using a Multi-Country Multi-City (MCC) dataset.

Data: The analysis uses data from mainland China, Japan, South Korea, Taiwan, Thailand, Malaysia, the Philippines, Viet Nam, and Australia. Additional countries are included as data become available.

Methods : We apply the two-stage time-series approach used in previous MCC studies. Temperature–mortality associations are estimated using distributed lag non-linear models with quasi-Poisson regression and then pooled via multilevel random-effects meta-analysis to obtain consistent exposure–response relationships. Attributable deaths and fractions are calculated by summing daily contributions, with cold and heat defined at the 2.5th and 97.5th percentiles of local temperatures. Economic impacts are evaluated using the Value of a Life Year (VOLY), assuming a 1-year displacement of deaths, with country-specific VOLY derived from income-adjusted international Value of a Statistical Life, and total burden computed as attributable deaths × VOLY, averaged by country and region.

Expected Outcomes : The study provides regional and country-specific estimates of mortality and economic costs attributable to non-optimal temperatures. Results are stratified by country and climatic zone, with exposure–response curves in capital cities.

Conclusion : Harmonized regional estimates of mortality and economic burden associated with temperature provide evidence to support climate adaptation and public health strategies in the Western Pacific Region.

Biography

Dr. Jinyu He is a research fellow at the National Institute for Environmental Studies, Japan, specializing in urban climate and public health. Her work focuses on analyzing high-resolution urban and demographic data to assess health and economic impacts of extreme temperatures, with the goal of translating these findings into actionable strategies for healthier, climate-resilient cities.

Association of holidays and the day of the week with circulatory mortality: multi-country study

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Background : Temporal variations in circulatory mortality risk related to weekends and holidays have been studied for decades. However, findings were heterogeneous across countries and regions, underscoring the need for studies in diverse cultural contexts. We aim to examine the association of national holidays and day of the week with circulatory mortality using the multi-county dataset.

Method : A two-stage analysis was conducted. In the first stage, we fitted a time-series regression with quasi-Poisson distribution to estimate the association between circulatory mortality and national holidays and day of the week for each country. A lag period from one day before to five days after each holiday was considered, and national holidays were further grouped into New Year's day, Christmas, and others. In the second stage, we performed a meta-regression model to pool the country-specific estimates and derived the best linear unbiased predictor for each country.

Result : This study included 37,334,576 deaths from 638 cities across 33 countries. Circulatory mortality risk increased for five days after national holidays, with relative risks ranging from 1.020 (95% CI: 1.014–1.026) to 1.001 (1.001–1.002). The increase in risk was greater on New Year's day than on other holidays. For Christmas, the increase was pronounced in America and Europe, but not in Western-Southern Asia where Christmas is not an official holiday. By day of the week, the risk increased on Monday and marginally decreased on weekends compared to Wednesday consistently across most regions.

Conclusion : Circulatory mortality risk increased on national holidays, especially on Christmas and New Year's day, although patterns varied by country and region. In most countries, the risk decreased on weekends and increased on Monday, consistent with previous findings. These results may inform prevention strategies addressing short-term temporal variations in circulatory mortality risk.

Biography

Jieun Oh is a PhD candidate in Public Health and Biostatistics at Seoul National University. She is interested in understanding how environmental conditions (e.g., climate change and green space) and temporal patterns influence health outcomes, using multi-country and nationwide cohort data.

Short-term association of nitrogen dioxide and sulfur dioxide with suicide: A multicountry study

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Background : Suicide is a major public health concern. Although previous studies have reported associations between air pollution and suicide, the evidence remains insufficient due to limited geographic coverage and varying analytical methods. We aimed to investigate the short-term associations of nitrogen dioxide (NO_2) and sulfur dioxide (SO_2) exposure with suicide mortality across 295 cities across 17 countries from 1980 to 2021.

Methods : We applied a two-stage design, using a conditional quasi-Poisson regression model in the first stage and a random-effects meta-analysis in the second stage. NO_2 and SO_2 were modeled as linear functions of three-day (lag 0–2) moving average concentrations. Attributable fractions (AFs) of excess suicides were estimated for exposures below WHO air quality guidelines. Bi-pollutant models assessed potential confounding by fine particulate matter ($PM_{2.5}$) and 8-hour maximum ozone.

Results : A total of 399,717 suicides were included. The average daily concentrations of NO_2 and SO_2 across cities were 26.7 $\mu g/m^3$ and 7.5 $\mu g/m^3$, respectively. Pooled estimates indicated that a 10 $\mu g/m^3$ increase in NO_2 was associated with a 1.5% increase in suicide risk (RR: 1.015; 95% CI: 1.004–1.025), while SO_2 showed a suggestive 2.3% increase (RR: 1.023; 95% CI: 0.992–1.056). Even at levels below WHO guidelines, short-term exposure to NO_2 and SO_2 was associated with excess suicide mortality, with AFs of 3.07% (95% empirical CI [eCI]: 2.57–3.53%) and 1.61% (95% eCI: 0.71–2.39%), respectively. Men and younger populations were more vulnerable to these risks. Associations remained robust after adjustment for $PM_{2.5}$ or ozone.

Conclusion : This large-scale, multi-country study provides robust evidence of short-term associations between NO_2 and SO_2 exposure and increased suicide risk, even at concentrations below WHO guidelines. These findings highlight the potential mental health benefits of adopting more stringent air quality standards.

Biography

Dr. Yoonhee Kim is an Associate Professor in the Department of Global Environmental Health, Graduate School of Medicine, The University of Tokyo, Japan. She is an environmental epidemiologist, and her research focuses on assessing health risks associated with weather and climate variability, as well as air pollution. She has conducted pioneering studies exploring the short-term associations between suicide risk and atmospheric environmental factors.

Mortality attributable to influenza and temperature across climate regions: a multi-country analysis

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Background : The concurrent effects of non-optimal temperature and influenza on daily mortality are not well understood, despite the extensive literature on the temperature-mortality associations. Moreover, the complex structure of influenza-mortality functions on a daily timescale has not been examined across different climate regions.

Objective : This study aimed to estimate the independent effects of temperature and influenza on daily mortality across diverse climates.

Methods : We collected data on influenza-like-illness (ILI) as a proxy for influenza incidence, daily mean temperature, and mortality cases from 62 cities across 20 countries and regions. Quasi-Poisson regression models with distributed lag non-linear functions (21 days of lag) were used to estimate the associations of ILI and temperature with mortality. These associations were pooled in a second stage using multivariate meta-analysis, from which attributable numbers and fractions were also computed.

Results : Excess mortality attributable to ILI was generally higher during the cold season, particularly in the dry and temperate climate regions, where strong seasonality was observed. In contrast, this pattern was less evident in tropical regions, where the contributions were relatively consistent throughout the year. Adjustment for daily mean temperature led to varying reductions in ILI-attributable mortality across climate regions. The largest reduction was observed in temperate regions, especially during the cold season, while in tropical regions, reductions were distributed more evenly throughout the year. Estimates of cold-related mortality in temperate regions and heat-related mortality in dry regions were particularly sensitive to adjustment for ILI.

Conclusion : These findings suggest that influenza and non-optimal temperature contribute to mortality to different extents across

Biography

Chris Fook Sheng Ng is an Associate Professor at The University of Tokyo, where he studies how climate and environmental factors such as extreme temperatures and air pollution affect human health. His research integrates epidemiology, climate science, and public health to inform evidence-based adaptation and resilience strategies in a changing climate.